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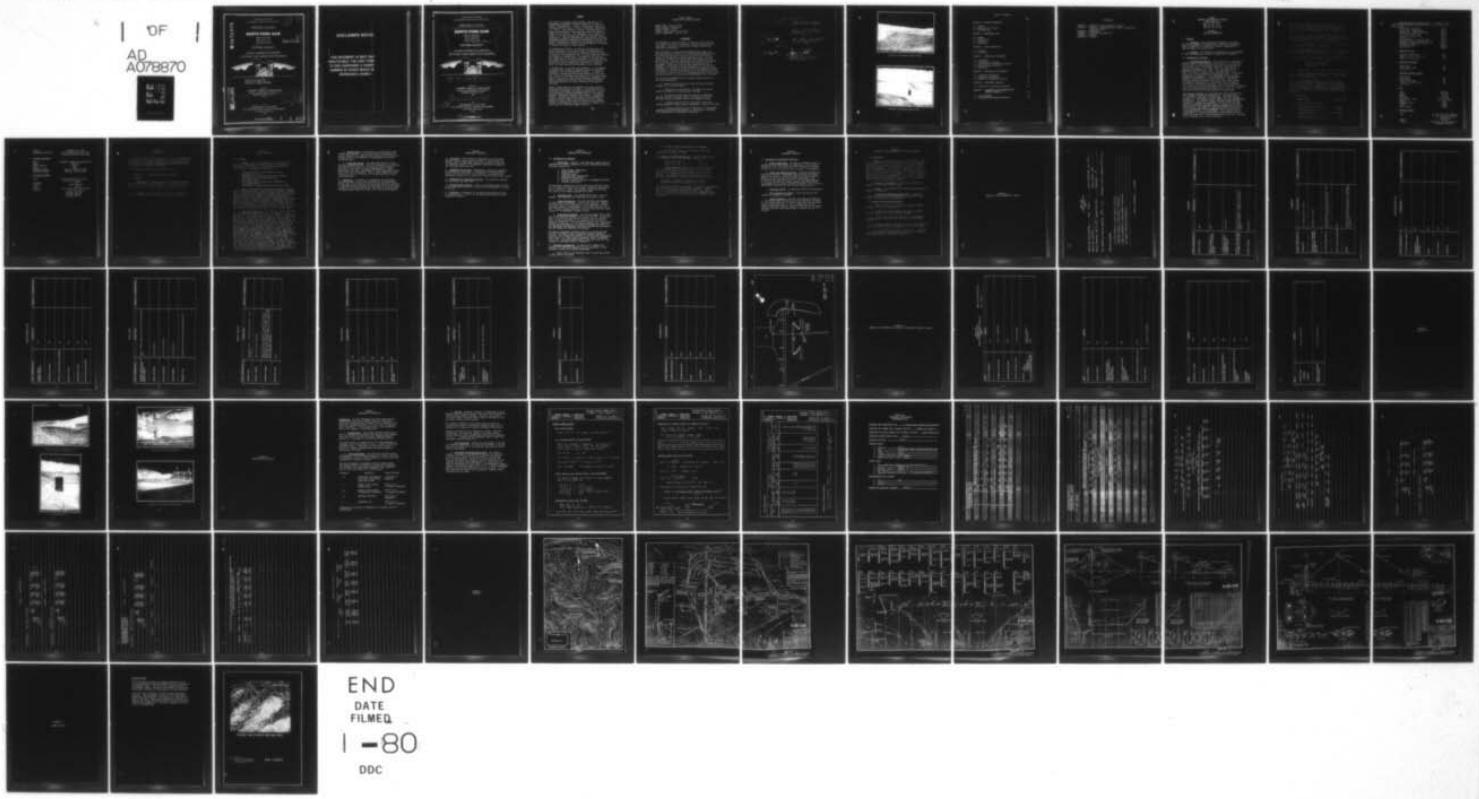

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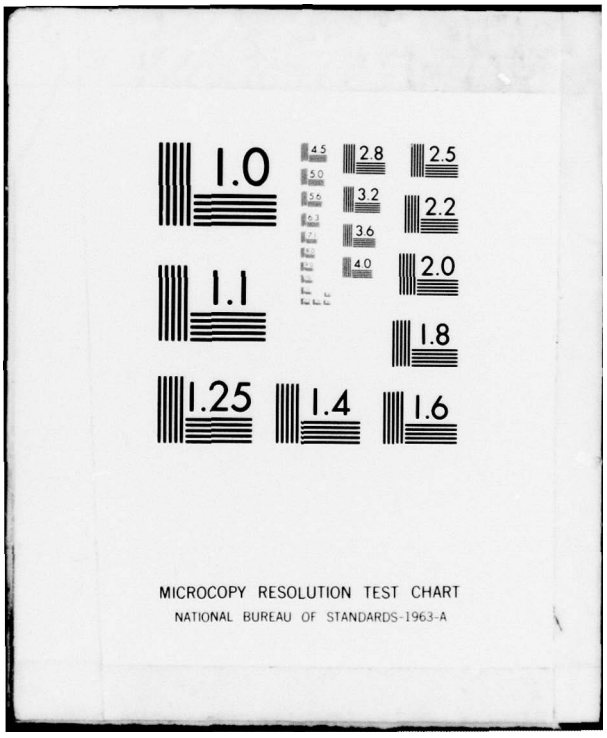
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SUSQUEHANNA RIVER BASIN

WHITE BRANCH of NORTH FORK, POTTER COUNTY

PENNSYLVANIA

NORTH FORK DAM

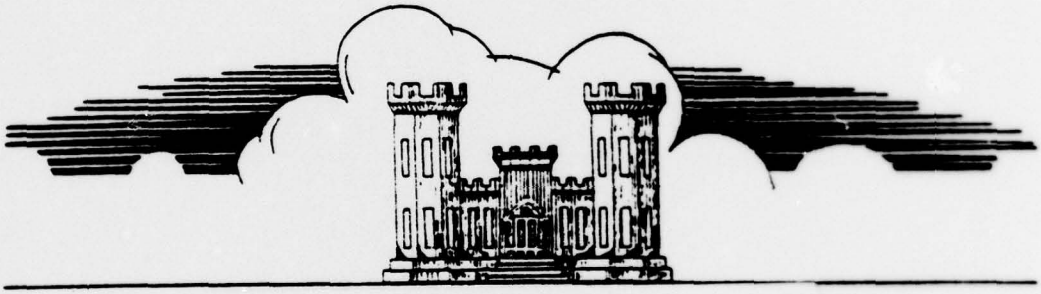
NDS ID NO. PA-28

DER ID NO. 53-57

SCS ID NO. PA-406

POTTER COUNTY

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



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Contract No. DACW31-79-C-0009

Prepared By

L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS & ARCHITECTS
EBENSBURG, PENNSYLVANIA
15931

FOR

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT CORPS OF ENGINEERS
BALTIMORE, MARYLAND
21203

SEPTEMBER 1979

SUSQUEHANNA RIVER BASIN
WHITE BRANCH of NORTH FORK, POTTER COUNTY
PENNSYLVANIA.

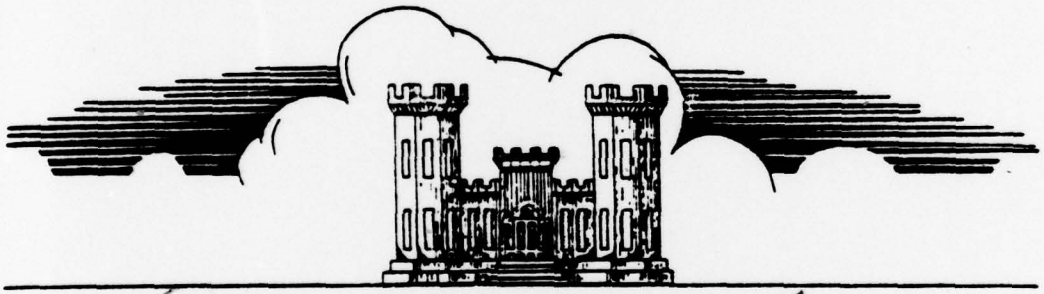
(6) National Dam Inspection Program.

NORTH FORK DAM

NDS ID Number PA-28
DER ID Number 53-57
SCS ID Number PA-406

POTTER COUNTY

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



(10) Kuang-hwei Chuang

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(15) DACW31-79-C-0079

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FOR
DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT CORPS OF ENGINEERS
BALTIMORE, MARYLAND
21203

(11) SEPTEMBER 1979

411 059

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I REPORT
NATIONAL DAM INSPECTION REPORT

NAME OF DAM: North Fork Dam
STATE LOCATED: Pennsylvania
COUNTY LOCATED: Potter
STREAM: White Branch of North Fork
DATE OF INSPECTION: June 27, 1979

[cont'd from p. 2]

ASSESSMENT

The assessment of North Fork Dam is based upon visual observations made at the time of inspection, review of available data and records, hydrologic and hydraulic computations and past operational performance.

North Fork Dam is a high hazard-intermediate size dam. The Spillway Design Flood (SDF) is the PMF (Probable Maximum Flood). The inspection and review of data of North Fork Dam did not reveal any problems which require emergency action. The dam appears to be stable, well maintained, safely operated and in good condition. However, the spillway and reservoir are capable of controlling 60% of the PMF without overtopping the earth embankment. Based upon criteria established by the Corps of Engineers, the spillway is termed inadequate, but not seriously inadequate. In addition, the earth berm in the emergency spillway exit channel is low and overtopping of the berm during flood conditions will cause erosion of the embankment/abutment contact. This spillway berm will be overtopped at approximately 25% of the PMF.

The following recommendations and remedial measures should be instituted immediately.

1. Raise the earth berm on the right spillway discharge channel to top of dam elevation.

2. The wet area at the bottom of the right rock gutter should be regraded to provide positive drainage.

3. The wet area on the left cut slope of the emergency spillway has shown a minimal amount of movement in the past. This area should be watched closely and drainage provided.

4. A warning system should be instituted to warn downstream residents of large spillway discharges or failure of the dam.

5. A safety inspection should be conducted by a registered professional engineer knowledgeable in dam design in accordance with Commonwealth of Pennsylvania regulations.

NORTH FORK DAM (PA-28)

SUBMITTED BY: L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS & ARCHITECTS

Kuang-hwei Chuang

Kuang-hwei Chuang, P.E.

SEP 14 1979

Date

R Jeffrey Kimball

R. Jeffrey Kimball, P.E.

APPROVED BY:

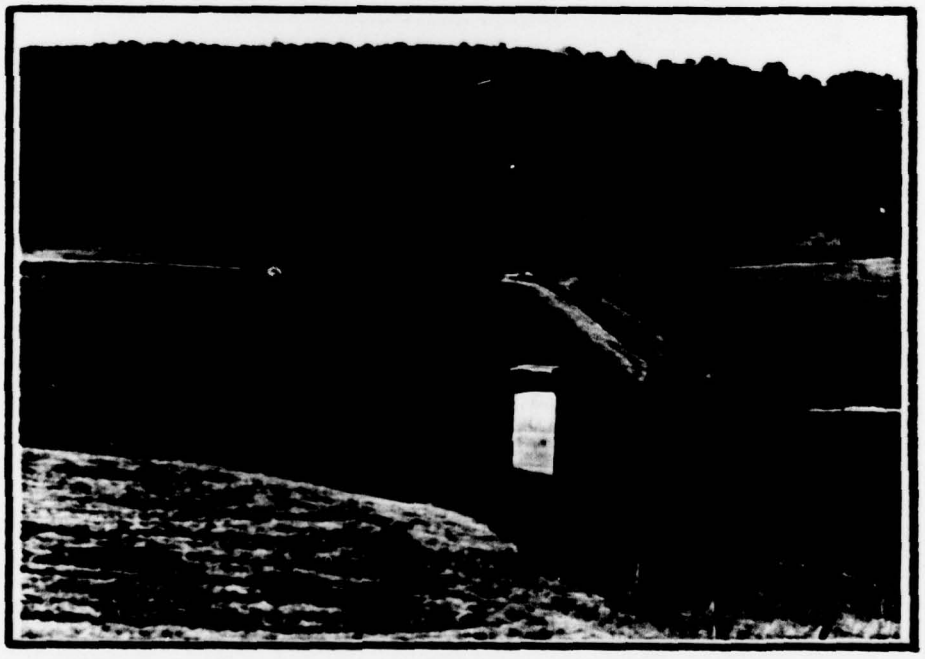
25 Sep 79

Date

James W. Peck

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

Overview of downstream slope of dam.



Overview of upstream slope of dam.

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APPENDICES

PHASE I
NATIONAL DAM INSPECTION PROGRAM
NORTH FORK DAM
NDI I.D. NO. PA 28
DER I.D. NO. 53-57
SCS I.D. NO. PA 406

SECTION 1
PROJECT INFORMATION

1.1 General.

a. Authority. The National Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.

b. Purpose. The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. North Fork Dam is a homogeneous earthfill dam 622 feet long and 58 feet high. A 10 foot wide cutoff trench is located beneath the crest of the dam and acts as a partial cutoff. The cutoff trench is 8 feet deep for a length of approximately 350 feet. Both the slopes of the embankment are 3H:1V with a berm. The crest width is 18 feet. No riprap is present on the upstream slope. A horizontal filter drain is installed in the downstream portion of the embankment approximately 74 feet downstream of the embankment centerline and parallel to the dam centerline. Where the principal spillway intersects the filter, the filter blanket is installed perpendicular to the dam axis and is placed on each side of the principal spillway. An 18 inch thickness of rock riprap is placed at the downstream toe of the dam. Discharge from this drainage system discharges into a 25 foot by 15 foot scour hole below the principal spillway discharge pipe.

The principal spillway is a two-stage drop inlet spillway with a 30" diameter reinforced concrete pipe. The riser unit is 2.5 feet by 7.5 feet and is 33 feet high. The first stage of spillway is a 15" diameter orifice installed in the upstream wall of the riser. This orifice opening controls normal flow and maintains a constant pool elevation. At the top of the riser unit is the principal spillway opening equipped with an anti-vortex device. The reservoir drain line consists of a 14" cast iron pipe extending from the upstream face of the riser unit to the upstream toe of the embankment. Flow in this drain is controlled by a 14" gate valve that is hand operated from the top of the riser unit. The principal spillway pipe has anti-seep collars constructed at 25 foot intervals.

The emergency spillway is located on the left abutment and is formed by a trapezoidal shaped open cut in glacial sand clay and gravel. The bottom width of the spillway channel is 100 feet. The spillway exit channel is 482 feet long and discharges on the left hillside below the toe of the dam.

[cont'd on P. 11]

b. Location. The dam is located on White Branch of North Fork, approximately 1.5 miles northwest of the village of North Fork, Potter County, Pennsylvania. North Fork Dam can be located on the Harrison Valley, U.S.G.S. 7.5 minute quadrangle.

c. Size Classification. North Fork Dam is an intermediate size structure (58 feet high, 749 acre-feet).

d. Hazard Classification. North Fork Dam is a high hazard dam. Downstream conditions indicate that loss of more than a few lives is probable should the structure fail (see Section 3.1e).

e. Ownership. North Fork Dam is owned by the Potter County Commissioners. Correspondence should be addressed to:

Potter County Commissioners
Coundersport, PA 16915
814-274-8290

f. Purpose of Dam. North Fork Dam is used for flood control.

g. Design and Construction History. The dam was designed by the Soil Conservation Service, U.S. Department of Agriculture. The dam was completed in 1960.

h. Normal Operating Procedures. Normal water level is maintained at the entrance invert of the principal spillway orifice (elevation 1888.0). During periods of flooding, water level is controlled in the reservoir by the principal spillway and the emergency spillway. No operations are conducted during flooding. The drain line valve is opened and lubricated twice each year.

1.3 Pertinent Data.

a. Drainage Area. 3.4 square miles

b. Discharge at Dam Site (cfs).

Maximum known flood at dam site	Unknown
14" drain line	Unknown
Principal spillway orifice at pool elevation 1909.0	Approximately 27
Principal spillway at pool elevation 1925.0	135
Emergency Spillway at top of dam	5401

c. Elevation (U.S.G.S. Datum) (feet). - elevations worked from principal spillway (elevation 1868.0) orifice shown on as built drawings.

Top of dam - low point	1929.2
Top of dam - design height	1927.5
Maximum pool - design surcharge	1927.0
Full flood control pool	1922.9
Emergency spillway crest	1922.9
Normal pool	1888.0
Upstream portal - 14" drain line	1874.8
Downstream invert principal spillway	1871.0
Streambed at centerline of dam	1871.0
Maximum tailwater	Unknown
Toe of dam	1866.0

d. Reservoir (feet).

Length of maximum pool	4000
Length of flood control pool	3500
Length of normal pool	700

e. Storage (acre-feet).

Normal pool	41
Flood control pool	626
Top of dam	749

f. Reservoir Surface (acres).

Top of dam	150
Maximum pool	150
Flood control pool	101
Emergency spillway crest	101
Normal pool	6

g. Dam.

Type	Earthfill
Length	622 feet
Height	58 feet
Top width	18 feet
Side slopes - both	3H:1V with berms
Zoning	None
Impervious core	None
Cutoff	Partial
Grout curtain	None

h. Reservoir Drain.

Type	14" cast iron pipe connected to 30" concrete principal spillway pipe
Length	372 feet
Closure	Valve with stem on principal spillway riser unit

Access	Upstream toe of dam
Regulating facilities	Valve connected to valve stem on principal spillway riser unit

i. Emergency spillway.

Type	Trapezoidal shaped uncontrolled cut
Length	100 feet
Crest elevation	1922.9
Gates	None
Upstream channel	Open cut, 235 feet long
Downstream channel	Open cut, 482 feet long

j. Principal Spillway.

Type	Uncontrolled concrete tower with concrete weir
Elevation	1909.0
Location	Upstream slope
Gates	None
Conduit	320' long - 36"Ø concrete pipe
Orifice	14' cast iron pipe in concrete principal spillway tower at elevation 1888.0

SECTION 2
ENGINEERING DATA

2.1 Design. Review of information in the files of the Commonwealth of Pennsylvania, Department of Environmental Resources and the Soil Conservation Service revealed that as-built construction drawings, design reports, and several photographs were available for review. All this data was reviewed for this study.

2.2 Construction. No data on construction exists.

2.3 Operation. No operating records are maintained.

2.4 Evaluation.

a. Availibility. Engineering data were provided by PennDER Bureau of Dams and Waterways Management and the Soil Conservation Service. Mr. Rankin, a Potter County commissioner, accompanied the inspection team to answer questions on operation of the dam.

b. Adequacy. The type and amount of design data and other engineer information is sufficient to complete a Phase I Report.

SECTION 3
VISUAL INSPECTION

3.1 Findings.

a. General. The onsite inspection of North Fork Dam was conducted by personnel of L. Robert Kimball and Associates accompanied by Mr. Rankin, a Potter County commissioner, on June 27, 1979. The inspection consisted of:

1. Visual inspection of the retaining structure, abutments, and toe.
2. Examination of the spillway facilities, exposed portions of any outlet works and other appurtenant works.
3. Observations affecting the runoff potential of the drainage basin.
4. Evaluation of the downstream area hazard potential.

b. Dam. The dam appears to be in good condition. The dam appears to conform closely to the as-built construction drawings with the exception of the emergency spillway and the low point on the top of the dam each being 0.7 feet higher than shown on the as-built drawings. The upstream and downstream slopes were measured at 3H:1V and are grass covered. The slopes were recently mowed. No signs of erosion, seepage or slumping were noted. On the downstream slope at the junction of the embankment and the abutment are rock gutters. At the bottom of the right rock gutter is a wet area where the gutter ends. Positive drainage is not provided from the bottom of the gutter to the discharge channel.

c. Appurtenant Structures. The reservoir level at the time of inspection was at elevation 1888.5. The reservoir is used strictly as flood control and the reservoir surface is very small. The concrete in the riser unit and discharge end of the principal spillway pipe appear to be in good condition. The principal spillway pipe and drainline were unobserved during the inspection. At the discharge end of the principal spillway a scour hole was constructed to act as an energy dissipator before entering the discharge channel. The emergency spillway is located on the left abutment and appeared to be in good condition. The crest of the emergency spillway was surveyed to be 0.7 feet higher than shown on the as-built drawings. The entire spillway approach and discharge channel are grassed and had recently been mowed. On the left cut slope of the emergency spillway discharge channel, a spring was present creating some movement of the cut slope. On the right side of the spillway exit channel, an earth berm was constructed to contain flows in the emergency spillway. However, the top of this berm is approximately 5 feet lower than the top of dam. During high flows through the emergency spillway, water would flow over this earth berm and along the embankment-abutment contact and cause severe erosion to the embankment.

d. Reservoir Area. The watershed is covered mostly with farmland and woodland. The reservoir slopes are moderate and are not susceptible to massive landslides which would affect the storage volume of the reservoir or overtopping of the dam by displacing water.

e. Downstream Channel. The downstream channel of North Fork Dam is moderately wide. The first residences to be affected by flood flows or failure of the dam would be the village of North Fork. North Fork is located approximately 1.5 miles downstream of the dam. Approximately 5 miles downstream of North Fork is the town of Westfield. Both of these communities would be severely affected if failure of the dam should occur under flood conditions.

3.2 Evaluation. In general, the embankment and appurtenant structures appear to be in good condition and well maintained. The wet area at the bottom of the rock gutter should be corrected by providing positive drainage from the gutter to the scour basin. In addition, the earth berm on the right portion of the spillway discharge channel should be raised to the top of dam elevation.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedures. The reservoir is maintained at the principal spillway orifice invert (elevation 1888.0). During flood conditions, water is discharged through the principal spillway and the emergency spillway. The reservoir drain valve is operated and lubricated twice each year.

4.2 Maintenance of the Dam. Maintenance of the dam is conducted by personnel of Potter County. Maintenance of the dam consists mostly of mowing the grass. Once each year, an operation and maintenance inspection is conducted with the Soil Conservation Service.

4.3 Maintenance of Operating Facilities. The valves are operated and lubricated twice each year.

4.4 Warning System in Effect. There is no warning system in effect to warn downstream residents of large spillway discharges or failure of the dam.

4.5 Evaluation. Maintenance of the dam and operating facilities is considered good. There is no warning system in effect to warn downstream residents.

SECTION 5
HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features.

a. Design Data. Hydraulic and hydrologic design data are contained in a report prepared by the Soil Conservation Service. This data consists of:

1. Stage-storage computations
2. Stage-storage curve
3. Stage-area curve
4. Stage-discharge computations
5. Hydrograph computations
6. Critical slope and velocity for emergency spillway
7. Drawdown calculations

The hydrograph computations used for North Fork Dam were based on 1.25 times the 6 hour point rainfall, moisture condition III and 8.42 inches of runoff. The rainfall used by the SCS does not relate to the Probable Maximum Flood (PMF).

b. Experience Data. The maximum known flood to date is unknown. The reservoir has controlled all floods to date.

c. Visual Observation. Principal spillway and emergency spillway facilities appeared to be in good condition. However, the earth berm on the right portion of the emergency spillway discharge channel is approximately 5 feet lower than the top of dam. During flooding conditions, flow over this berm will cause erosion of the embankment abutment contact.

d. Overtopping Potential. The Spillway Design Flood (SDF) for a high hazard-intermediate size dam is the PMF. The rainfall used by the SCS does not meet the criteria used for the PMF. Thus, the spillway design is not acceptable for the Corps of Engineers guidelines. The overtopping potential was investigated through the development of the Probable Maximum Flood (PMF) for the watershed and subsequent routing of the PMF and fractions of the PMF through the reservoir and spillway.

The Corps of Engineers, Baltimore District, has directed that the HEC-1 Dam Safety Version systemized computer program be utilized. The program was prepared by the Hydrologic Engineering Center (HEC), U.S. Army Corps of Engineers, Davis, California, July, 1978. The major methodologies or key input data for this program are discussed briefly in Appendix D.

5.2 Evaluation Assumptions. To enable us to complete the hydraulic and hydrologic analysis for this structure, it was necessary to make the following assumptions.

1. Water level in the reservoir prior to flood was at the spillway orifice elevation.

2. No flow through the drain line was considered.

3. The low point on the top of the dam (1929.2) was considered to be the top of dam.

5.3 Summary of Overtopping Analysis. Complete summary sheets for the computer output are presented in Appendix D.

Peak inflow (PMF)	8966 cfs
Emergency Spillway Capacity	5401 cfs

a. Spillway Adequacy Rating. The Spillway Design Flood for a high hazard-intermediate size dam is the PMF. The SDF is based on the hazard and size classification of the dam. Based on the following definition provided by the Corps of Engineers, this spillway is rated as inadequate but not seriously inadequate as a result of our hydrologic analysis.

> Inadequate - intermediate size dams which do not pass the PMF, but which do pass 50% of the PMF.

The spillway and reservoir are capable of controlling approximately 60% of the PMF without overtopping the embankment. However, because of the low earth berm on the spillway exit channel, flow over the berm will cause erosion of the embankment/abutment contact. The earth berm will overtop with approximately 25% of the PMF.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Observations. No signs of slumping, erosion or instability were noted during the inspection. The wet area at the bottom of the rock gutter should be repaired by providing drainage so as to not saturate the toe area of the embankment.

b. Design and Construction Data. Stability analyses were performed by the Soil Conservation Service during the design phase of the project. Using the Swedish Slip Circle method of analysis and 3H;1V slopes upstream and downstream, it was determined that safety factors of 1.41 for the downstream and 1.2 for the upstream with sudden drawdown conditions between the emergency and principal spillway elevations could be expected. These safety factors do not meet current design criteria.

c. Operating Records. No operating records are maintained.

d. Post Construction Changes. There have been no post construction changes to the dam.

e. Seismic Stability. The dam is located in seismic zone 1. No seismic stability analysis has been performed. Normally, it can be considered that if a dam in this zone is stable under static loading conditions, it can be assumed safe for any expected earthquake loading. Because of the low risk of seismic occurance and the visual observations, no dynamic analysis is required.

SECTION 7
ASSESSMENT AND RECOMMENDATIONS/REMEDIAL MEASURES

7.1 Dam Assessment.

a. Safety. The dam appears to be in good condition. The visual observations, review of available information, hydraulic and hydrologic calculations and past operational performance indicate that North Fork Dam's spillway is inadequate, but not seriously inadequate. The spillway is capable of controlling 60% of the PMF without overtopping the embankment. However, flow over the earth berm on the spillway exit channel will cause serious erosion of the embankment/abutment contact. The earth berm will overtop with approximately 25% of the PMF. Stability analyses have been performed for the design of the structure but do not meet current design criteria.

b. Adequacy of Information. Sufficient information is available to complete a Phase I Report.

c. Urgency. The recommendations suggested below should be implemented immediately.

d. Necessity for Further Investigations. In order to intiate the recommendations/remedial measures outlined below, further investigations will be required.

7.2 Recommendations/Remedial Measures.

1. Raise the earth berm on the right spillway discharge channel to the top of dam elevation.

2. The wet area at the bottom of the right rock gutter should be regraded to provide positive drainage.

3. The wet area on the left cut slope of the emergency spillway should be watched closely for movement and drainage provided.

4. A warning system should be instituted to warn downstream residents of large spillway discharges or failure of the dam.

5. A safety inspection should be conducted by a registered professional engineer knowledgeable in dam design in accordance with Commonwealth of Pennsylvania regulations.

APPENDIX A
CHECKLIST, VISUAL INSPECTION, PHASE I

CHECK LIST
VISUAL INSPECTION
PHASE I

NAME OF DAM North Fork Dam COUNTY Potter STATE Pennsylvania ID# PA 28

TYPE OF DAM Earthfill HAZARD CATEGORY High

DATE(s) INSPECTION June 27, 1979 WEATHER Clear, warm TEMPERATURE 70°

POOL ELEVATION AT TIME OF INSPECTION 1888.5 M.S.L. TAILWATER AT TIME OF INSPECTION 1867.8 M.S.L.

INSPECTION PERSONNEL:

R. Jeffrey Kimball, L. Robert Kimball & Associates

Kuang-hwei Chuang, L. Robert Kimball & Associates

James T. Hockensmith, L. Robert Kimball & Associates

Mr. Rankin, Potter County Commissioner

James T. Hockensmith RECORDER

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	None noted.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Horizontal alignment appeared to be good. Vertical alignment - ranges from 1929.2 to 1931.2.	
RIPRAP FAILURES	No riprap.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
VEGETATION	All slopes grassed - mowed.	
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Appeared to be good.	
ANY NOTICEABLE SEEPAGE	No seepage noted. Wet area at bottom of right gutter on the downstream slope of dam.	
STAFF GAUGE AND RECORDER	None.	
DRAINS	Drain under downstream portion of embankment. No water flowing from underdrain pipes during inspection.	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	N/A	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	N/A	
DRAINS	N/A	
WATER PASSAGES	N/A	
FOUNDATION	N/A	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	N/A	
STRUCTURAL CRACKING	N/A	
VERTICAL AND HORIZONTAL ALIGNMENT	N/A	
MONOLITH JOINTS	N/A	
CONSTRUCTION JOINTS	N/A	
STAFF GAUGE OR RECORDER	N/A	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Outlet conduit unobserved except at the discharge end.	
INTAKE STRUCTURE	Good condition.	
OUTLET STRUCTURE	No outlet structure.	
OUTLET CHANNEL	Good condition.	
EMERGENCY GATE	Unobserved and not operated during inspection.	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	No concrete weir. Grassed control section - good condition.	
APPROACH CHANNEL	Open cut in good condition.	
DISCHARGE CHANNEL	Open cut in good condition - except for seepage exiting left cut slope and minor movement of slope. Right berm on exit channel approx. 5 feet lower than top of dam. Flow over this berm during flooding will erode embankment abutment.	
BRIDGE AND PIERS	None.	

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	N/A	
APPROACH CHANNEL	N/A	
DISCHARGE CHANNEL	N/A	
BRIDGE AND PIERS	N/A	
GATES AND OPERATION EQUIPMENT	N/A	

DOWNSTREAM CHANNEL

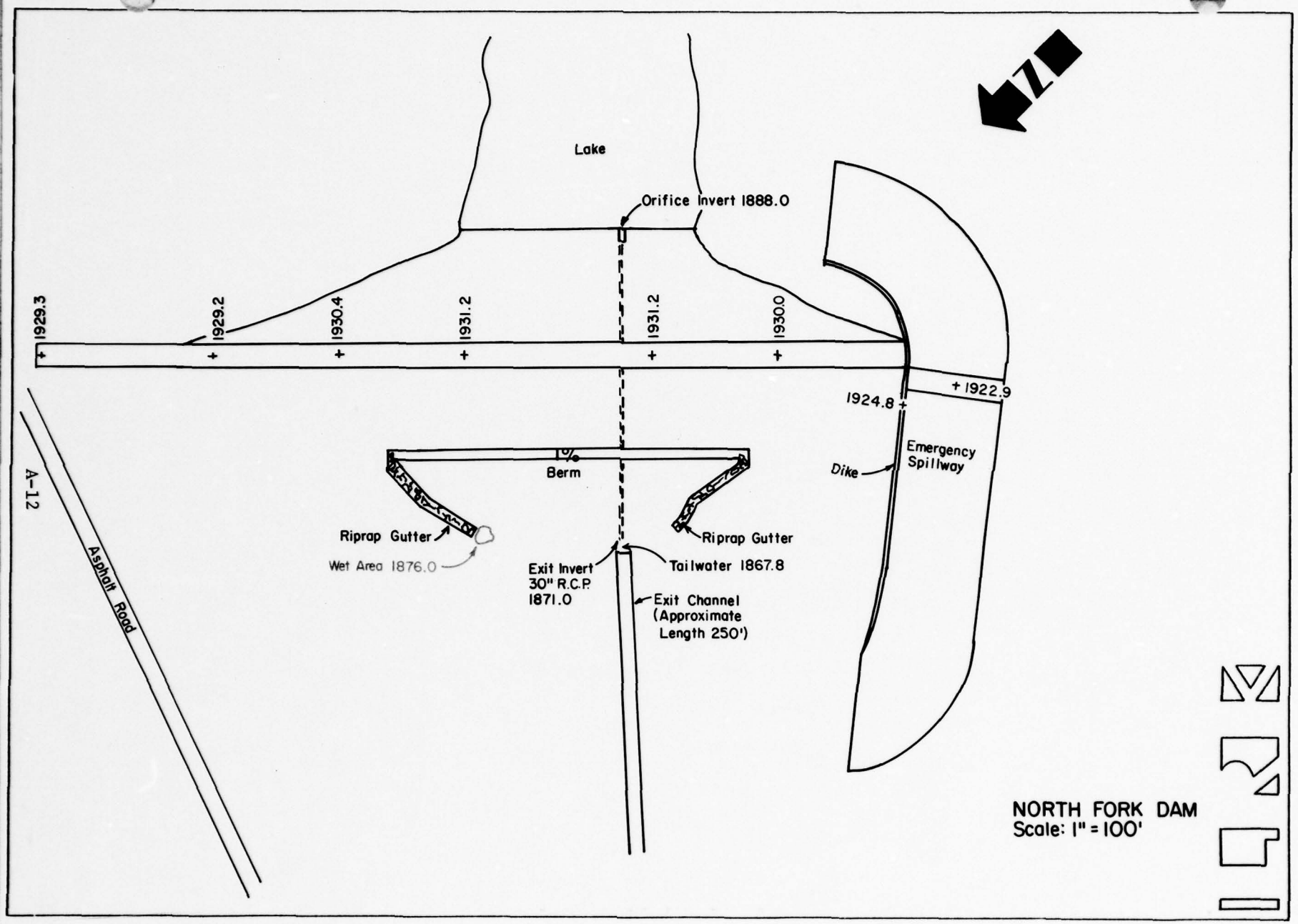
VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Moderately wide, no obstructions noted.	
SLOPES	Stable.	
APPROXIMATE NO. OF HOMES AND POPULATION	Approximately 200 homes (800 people).	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Moderate.	
SEDIMENTATION	Minor.	

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None.	
OBSERVATION WELLS	None.	
WEIRS	None.	
PIEZOMETERS	None.	
OTHER	None.	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1930.4
1931.2
1931.2
1930.0
1924.8
1922.9
Emergency Spillway
Dike
Berm
Riprap Gutter
Riprap Gutter
Wet Area 1876.0
Exit Invert 30" R.C.P. 1871.0
Tailwater 1867.8
Exit Channel (Approximate Length 250')
A-12
Asphalt Road
NORTH FORK DAM
Scale: 1" = 100'

APPENDIX B
BHECKLIST, ENGINEERING DATA, DESIGN, CONSTRUCTION OPERATION, PHASE I

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM North Fork

ID# PA 28

ITEM	REMARKS
AS-BUILT DRAWINGS	SCS
REGIONAL VICINITY MAP	U.S.G.S. quadrangle
CONSTRUCTION HISTORY	None.
TYPICAL SECTIONS OF DAM	As built drawings
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS RAINFALL/RESERVOIR RECORDS	As built drawings Design Report None.

ITEM	REMARKS
DESIGN REPORTS	SCS
GEOLOGY REPORTS	SCS
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	SCS
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	SCS
POST-CONSTRUCTION SURVEYS OF DAM	None.
BORROW SOURCES	Construction drawings

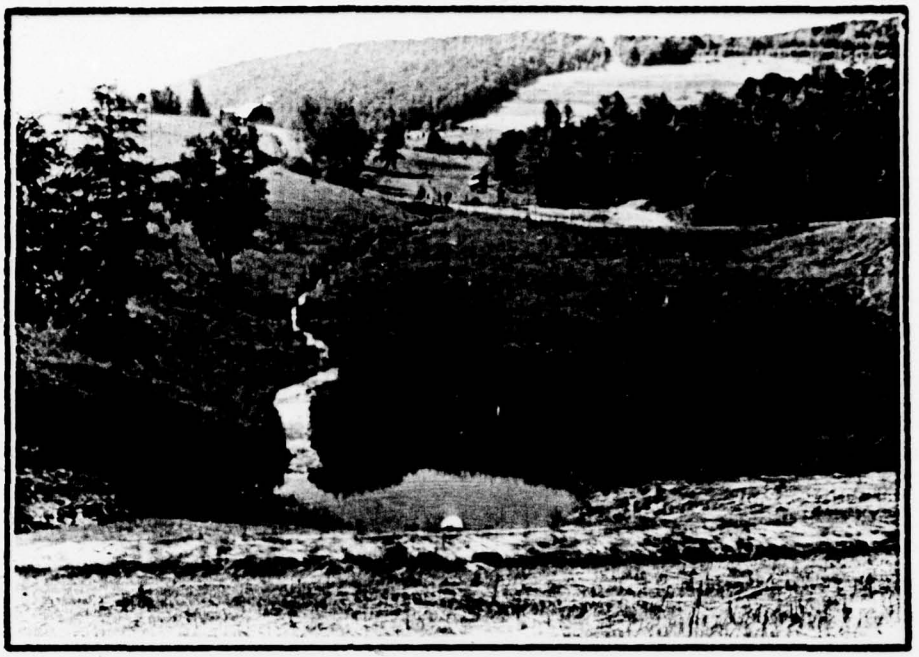
ITEM	REMARKS
MONITORING SYSTEMS	None
MODIFICATIONS	None
HIGH POOL RECORDS	None
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None
MAINTENANCE OPERATION RECORDS	None

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	As built drawings SCS
OPERATING EQUIPMENT PLANS & DETAILS	As built drawings SCS

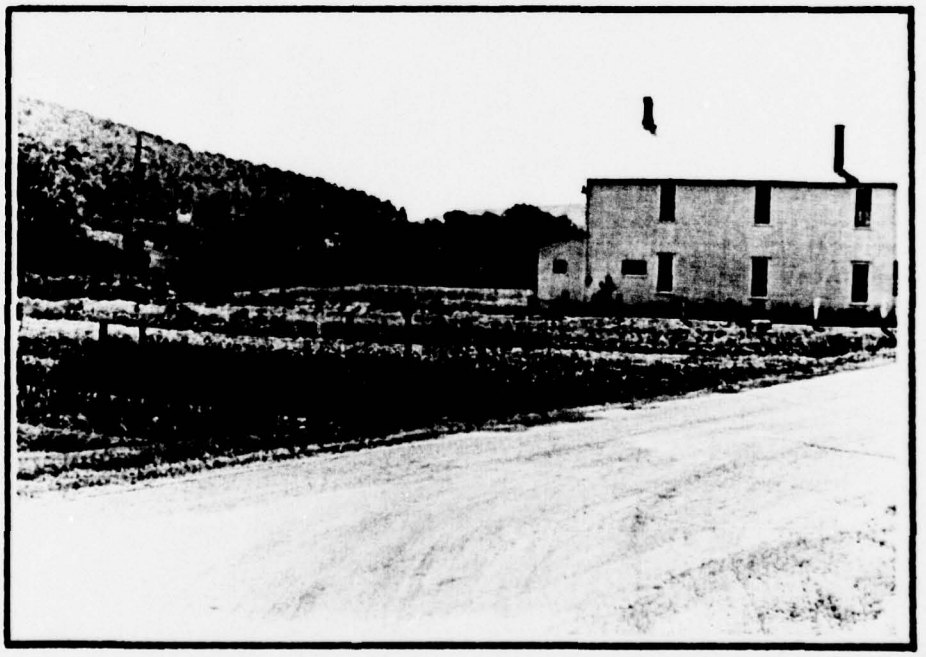
APPENDIX C
PHOTOGRAPHS

Emergency spillway discharge channel.
Note low spot on right berm.

Principal spillway.



Immediate downstream channel.



Residence in village of North Fork.

APPENDIX D
HYDROLOGY AND HYDRAULICS

APPENDIX D
HYDROLOGY AND HYDRAULICS

Methodology. The dam overtopping and breach analyses were accomplished using the systemized computer program HEC-1 (Dam Safety Investigation), September, 1978, prepared by the Hydrologic Engineering Center, U.S. Army Corps of Engineers, Davis, California. A brief description of the methodology used in the analysis is presented below.

1. Precipitation. The Probable Maximum Precipitation (PMP) is derived and determined from regional charts prepared from past rainfall records including "Hydrometeorological Reports No. 40 prepared by the National Weather Service.

The index rainfall is reduced from 10% to 20% depending on watershed size by utilization of what is termed the HOP Brook adjustment factor. Distribution of the total rainfall is made by the computer program using distribution methods developed by the Corps.

2. Inflow Hydrograph. The hydrologic analysis used in development of the overtopping potential is based on applying a hypothetical storm to a unit hydrograph to obtain the inflow hydrograph for reservoir routing.

The unit hydrograph is developed using the Snyder method. This method requires calculation of several key parameters. The following list gives these parameters their definition and how they were obtained for these analysis.

Parameter	Definition	Where Obtained
C_t	Coefficient representing variations of watershed slope and storage	From Corps of Engineers*
L	Length of main stream channel miles	From U.S.G.S. 7.5 minute topographic
L_{ca}	Length on main stream to centroid of watershed	From U.S.G.S. 7.5 minute topographic
C_p	Peaking coefficient	From Corps of Engineers*
A	Watershed size	From U.S.G.S. 7.5 minute topographic

*Developed by the Corps of Engineers on a regional basis for Pennsylvania.

3. Routing. Reservoir routing is accomplished by using Modified Plus routing techniques where the flood hydrograph is routed through reservoir storage. Hydraulic capacities of the outlet works, spillways and the crest of the dam are used as outlet controls in the routing.

The hydraulic capacity of the outlet works can either be calculated and input or sufficient dimensions input and the program will calculate an elevation discharge relationship.

Storage in the pool area is defined by an area - elevation relationship from which the computer calculates storage. Surface areas are either planimetered from available mapping or U.S.G.S. 7.5 minute series topographic maps or taken from reasonably accurate design data.

4. Dam Overtopping. Using given percentages of the PMF the computer program will calculate the percentage of the PMF which can be controlled by the reservoir and spillway without the dam overtopping.

5. Dam Breach and Downstream Routing. The computer program is equipped to determine the increase in downstream flooding due to failure of the dam caused by overtopping. This is accomplished by routing both the pre failure peak flow and the peak flow through the breach (calculated by the computer with given input assumptions) at a given point in time and determining the water depth in the downstream channel. Channel cross-sections taken from U.S.G.S. 7.5 minute topographic maps were used in the downstream flood wave routing. Pre and post failure water depths are calculated at locations where cross-sections are input.

L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS & ARCHITECTS
EBENSBURG PENNSYLVANIA

DAM NAME NORTH FORK DAM
I.D. NUMBER PA. 53-57
SHEET NO. 1 OF 3
BY OTM DATE 8-10-79

NORTH FORK DAM

DRAINAGE AREA

AREA = 3.4 mi^2 (PA. DER & USGS. QUADS.)

UNIT HYDROGRAPH PARAMETERS

DAMSITE LOCATED IN ZONE #16, SUSQUEHANNA RIVER BASIN. FROM CORPS OF ENGINEERS, BALTIMORE DISTRICT REGIONAL STUDY.

$C_p = 0.49$, $C_t = 0.8$

$L = 4.0$ mi, $L_{ca} = 2.0$ mi (FROM USGS 7.5-MIN. QUAD)

$t_p = C_t (L \times L_{ca})^{0.3} = 0.8 (4 \times 2)^{0.3}$

$t_p = 1.49$ HRS. (SNYDERS LAG (t_p) IN HRS)

LOSS RATE AND BASE FLOW PARAMETERS

AS RECOMMENDED BY CORPS OF ENGINEERS, BALTIMORE DISTRICT.

STRTL	=	1 INCH
CNSTL	=	0.05 IN./HR.
STRTQ	=	1.5 cfs/mi^2
QRCSN	=	0.05 (5% OF PEAK FLOW)
RTIOR	=	2.0

PROBABLE MAXIMUM STORM

FROM H.R. No. 40
PMP INDEX RAINFALL = 22.2 (1.00) = 22.2 IN.

$R_6 = 117\%$, $R_{12} = 127\%$, $R_{24} = 136\%$, $R_{48} = 143\%$, $R_{72} = 145\%$

ELEVATION - AREA - CAPACITY RELATIONSHIP

FROM U.S.G.S. 7.5-MIN. QUADS, D.E.R. FILES AND FIELD INSPECTION DATA.

AT SPILLWAY CREST ELEV. 1888'
INITIAL STORAGE = 41 AC. FT

$S	0	41	100	200	338	400	626	700	900
$E	1876	1888	1894	1901	1909	1912	1923	1927	1936

DISCHARGE RATING CURVE

$Q_1 = C A \sqrt{2gh}$ HANDBOOK OF APPLIED HYDRAULICS

$C = 0.62$, AREA (A) = 1.23 FT^2

$Q_2 = C L H^{3/2}$ WHERE $C = 3.1$

$Q_3 = A \sqrt{2gh/\Sigma k}$ CHOW

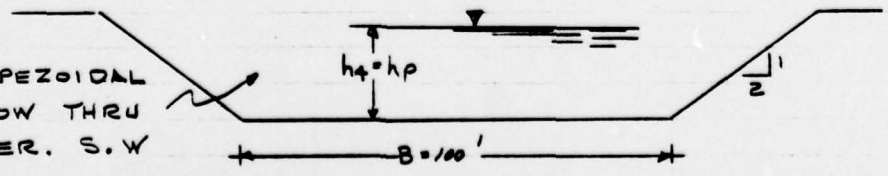
WHERE AREA (A) = 4.9 FT^2 AND $\Sigma K = 4.6$

$Q_4 = 8.03\, C' h_v^{1/2} (h_p - h_v) [B + Z(h_p - h_v)]$

WHERE $h_v = \dfrac{3(2Z h_p + B) - (16Z^2 h_p^2 + 16 Z B h_p + 9B^2)^{1/2}}{10Z}$

$C' = 0.95$, $B = 100'$, $Z = Z$ (LOW DAMS, by NAT. RES. COMMITTEE)

Q_4 = TRAPEZOIDAL FLOW THRU EMER. S.W



RATING CURVE

ELEVATION (FT)	PRINCIPAL SPILLWAY						EMERGENCY SPILLWAY		DISCHARGE Q (cfs)
	ORIFICE		WEIR		FULL PIPE		TRAPEZOIDAL		
	h_1 (FT.)	Q_1 (cfs)	h_2 (FT.)	Q_2 (cfs)	h_3 (FT.)	Q_3 (cfs)	h_4 (FT)	Q_4 (cfs)	
1888	0	0							0
1890	1.4	8							8
1895	6.4	16							16
1900	11.4	21							21
1909	20.4	27							27
1910	21.4	28	1	47	37.8	114			75
1911			2	132	38.8	115			115
1915					42.8	122			122
1920					47.8	128			128
1925					52.8	135	2.1	919	1054
1930					57.8	141	7.1	6088	6229
1935					62.8	146	12.1	14397	14543
1940					67.8	151	17.1	25636	25787
1945					72.8	157	22.1	39814	39971
1950					77.8	162	27.1	57003	57165

OVERTOP PARAMETERS

TOP OF DAM ELEV. = 1929.2', LENGTH OF DAM – #L_{MAX} = 694', #V_{MAX} = 1940'
COEFFICIENT OF DISCHARGE = 3.0 (BROAD CREST WEIR)

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EBENSBURG PENNSYLVANIA

DAM NAME NORTH FORK DAM
I.D. NUMBER PA. 53-57
SHEET NO. 3 OF 3
BY DTM DATE 8-9-79

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 3. square miles (farmland and woodland)

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 1888.0 (41 ac-ft)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 1922.9 (626 ac-ft)

ELEVATION MAXIMUM DESIGN POOL: 1927.0

ELEVATION TOP DAM: 1929.2

SPILLWAY CREST:

a. Elevation 1922.9
b. Type Trapezoidal shaped uncontrolled earth cut
c. Width 20 ft.
d. Length 100 ft.
e. Location Spillover Left abutment
f. Number and Type of Gates None

OUTLET WORKS:

a. Type Riser unit connected to 30 inch concrete pipe
b. Location Through dam
c. Entrance inverts 1909.0
d. Exit inverts 1871.0
e. Emergency draindown facilities 14" cast iron drainline

HYDROMETEOROLOGICAL GAUGES:

a. Type None
b. Location
c. Records

MAXIMUM NON-DAMAGING DISCHARGE: Unknown

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***********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
***********************************
 1        A1     ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF
 2        A2     HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF NORTH FORK DAM
 3        A3     RATIOS OF PMF ROUTED THROUGH THE RESERVOIR  (PA, 53-57)
 4        B    288       0      15       0       0       0       0       0       0       0
 5        B1     5
 6        J      1       5       1
 7        J1    .1      .3      .5      .7       1
 8        K      0       1                                               1
 9        K1     INFLOW TO RESERVOIR
10        M      1       1     3.4             3.4                                        1
11        P           22.2     117     127     136     143     145
12        T                                                    1    0.05
13        W   1.49    0.49
14        X   -1.5    -.05     2.0
15        K      1       2                                     1
16        K1     ROUTE THRU RESERVOIR
17        Y                              1       1
18        Y1     1                                         -1888      -1
19        Y4  1888    1890    1895    1900    1909    1910    1911    1915    1920    1925
20        Y4  1930    1935    1940    1945    1950
21        Y5     0       8      16      21      27      75     115     122 [illegible]   1094
22        Y5  6229   14543   25787   39971   57165
23        $S     0      41     100     200     338     400     500     626     700     900
24        $E  1876    1888    1894    1901    1909    1912    1917    1923    1927    1936
25        $$  1888
26        $D1929.2     260     115     694
27        $L   122     322     622     684     696
28        $V1929.2    1930    1931    1935    1940
29        K     99
```

QQQ HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79

RUN DATE 79/08/09.
TIME 12.56.01.

ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF
HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF NORTH FORK DAM
RATIOS OF PMF ROUTED THROUGH THE RESERVOIR (PAGES 83-87)

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
288	0	15	0	0	0	0	0	0	0

JOPER	NWT	LROPT	TRACE
1	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 5 LRTIO= 1

SUB-AREA RUNOFF COMPUTATION

INFLOW TO RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	3.40	0.00	3.40	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.20	117.00	127.00	136.00	143.00	145.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.49 CP= .49 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 6.50 AND R= 8.18 INTERVALS

UNIT HYDROGRAPH 47 END-OF-PERIOD ORDINATES, LAG= 1.50 HOURS, CP= .49 VOL= 1.00

43.	160.	323.	499.	643.	724.	720.	652.	577.	511.
452.	400.	354.	313.	277.	245.	217.	192.	170.	150.
133.	117.	104.	92.	81.	72.	64.	56.	50.	44.
39.	35.	31.	27.	24.	21.	19.	17.	15.	13.
11.	10.	9.	8.	7.	6.	5.			

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8966.	6084.	2088.	714.	205677.
CMS	254.	172.	59.	20.	5824.

ROUTE THRU RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	1	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1888.	-1

STAGE	1888.00	1890.00	1895.00	1900.00	1909.00	1910.00	1911.00	1915.00	1920.00
1925.00									
	1930.00	1935.00	1940.00	1945.00	1950.00				
FLOW	0.00	8.00	16.00	21.00	27.00	75.00	115.00	122.00	128.00
1054.00									
	6229.00	14543.00	25787.00	39971.00	57165.00				
CAPACITY=	0.	41.	100.	200.	338.	400.	500.	626.	700.	900.
ELEVATION=	1876.	1888.	1894.	1901.	1909.	1912.	1917.	1923.	1927.	1936.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1888.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1929.2	3.0	1.5	694.

CREST LENGTH AT OR BELOW ELEVATION	122.	322.	622.	654.	694.
	1929.2	1930.0	1931.0	1935.0	1940.0

STATION 2. PLAN 1. RATIO 1

PEAK OUTFLOW IS 116. AT TIME 47.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	116.	115.	65.	26.	7388.
CMS	3.	3.	2.	1.	209.
INCHES		.32	.71	.84	.84
MM		8.01	18.11	21.39	21.39
AC-FT		57.	129.	153.	153.
THOUS CU M		70.	159.	188.	188.

STATION 2. PLAN 1. RATIO 2

PEAK OUTFLOW IS 2234. AT TIME 42.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2234.	1215.	425.	157.	45200.
CMS	63.	34.	12.	4.	1280.
INCHES		3.32	4.65	5.15	5.15
MM		84.41	118.12	130.88	130.88
AC-FT		602.	843.	934.	934.
THOUS CU M		743.	1040.	1152.	1152.

STATION 2, PLAN 1, RATIO 3

PEAK OUTFLOW IS 4359. AT TIME 41.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4359.	2617.	836.	297.	85398.
CMS	123.	74.	24.	8.	2418.
INCHES		7.16	9.15	9.74	9.74
MM		181.85	232.47	247.28	247.28
AC-FT		1298.	1659.	1764.	1764.
THOUS CU M		1601.	2046.	2176.	2176.

STATION 2, PLAN 1, RATIO 4

PEAK OUTFLOW IS 6202. AT TIME 41.25 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6202.	4010.	1253.	437.	125852.
CMS	176.	114.	35.	12.	3564.
INCHES		10.97	13.71	14.35	14.35
MM		278.66	348.23	364.41	364.41
AC-FT		1988.	2485.	2600.	2600.
THOUS CU M		2453.	3065.	3207.	3207.

FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79

STATION 2, PLAN 1, RATIO 5

PEAK OUTFLOW IS 8981. AT TIME 41.25 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8981.	6005.	1882.	648.	186766.
CMS	254.	170.	53.	18.	5289.
INCHES		16.43	20.59	21.29	21.29
MM		417.30	523.07	540.80	540.80
AC-FT		2978.	3732.	3859.	3859.
THOUS CU M		3673.	4604.	4760.	4760.

8/9 14x8

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .10	RATIO 2 .30	RATIO 3 .50	RATIO 4 .70	RATIO 5 1.00
HYDROGRAPH AT	1	3.40	1	897.	2690.	4483.	6276.	8966.
	(	8.81)	(	25.39)(	76.17)(	126.95)(	177.73)(	253.90)(
ROUTED TO	2	3.40	1	116.	2234.	4359.	6202.	8981.
	(	8.81)	(	3.29)(	63.26)(	123.44)(	175.63)(	254.31)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1888.00	1888.00	1929.20
STORAGE	41.	41.	749.
OUTFLOW	0.	0.	5401.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.10	1911.61	0.00	392.	116.	0.00	47.00	0.00
.30	1926.14	0.00	684.	2234.	0.00	42.50	0.00
.50	1928.19	0.00	727.	4359.	0.00	41.50	0.00
.70	1929.76	.56	761.	6202.	1.50	41.25	0.00
1.00	1930.71	1.51	782.	8981.	3.50	41.25	0.00

APPENDIX E
DRAWINGS

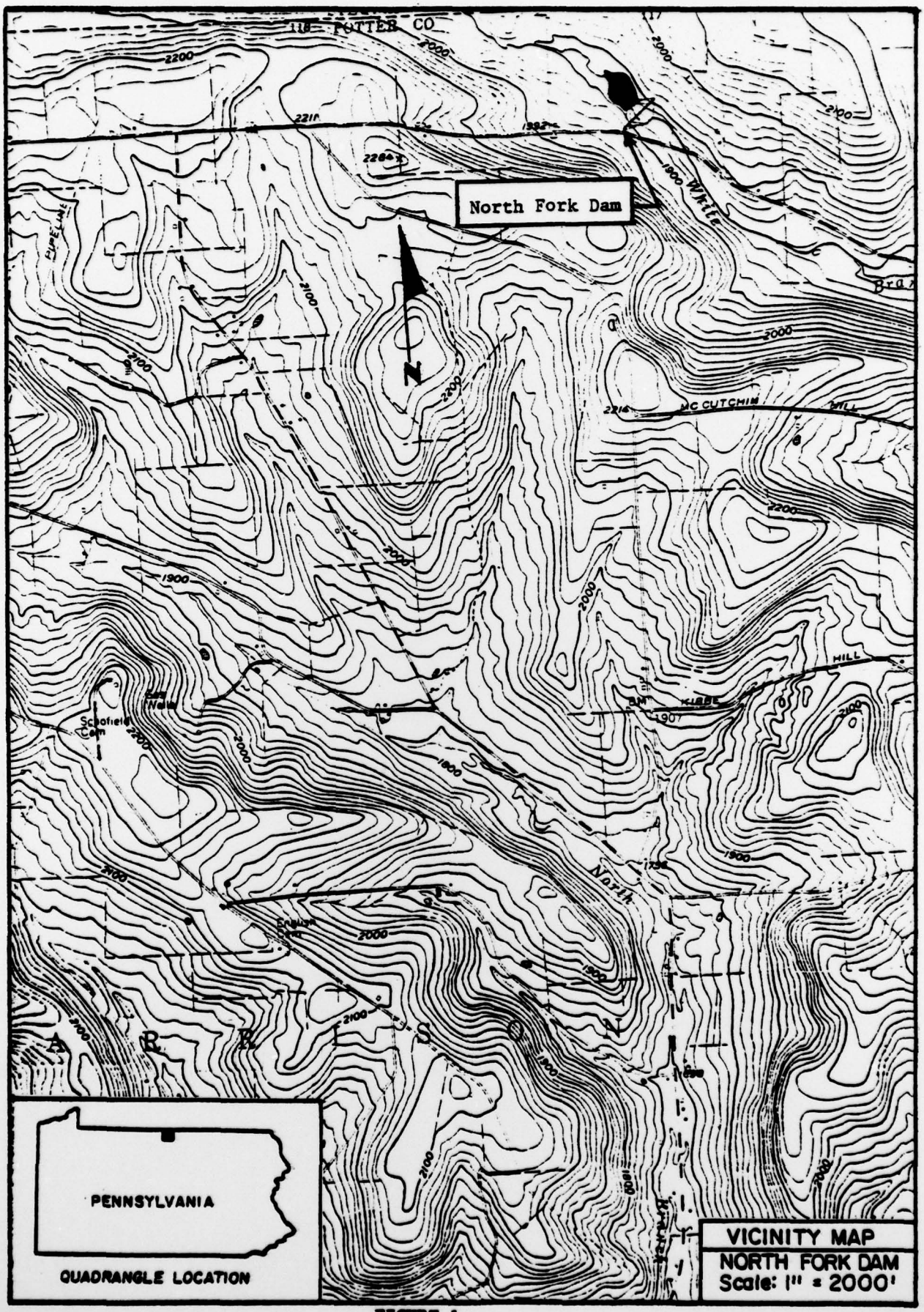
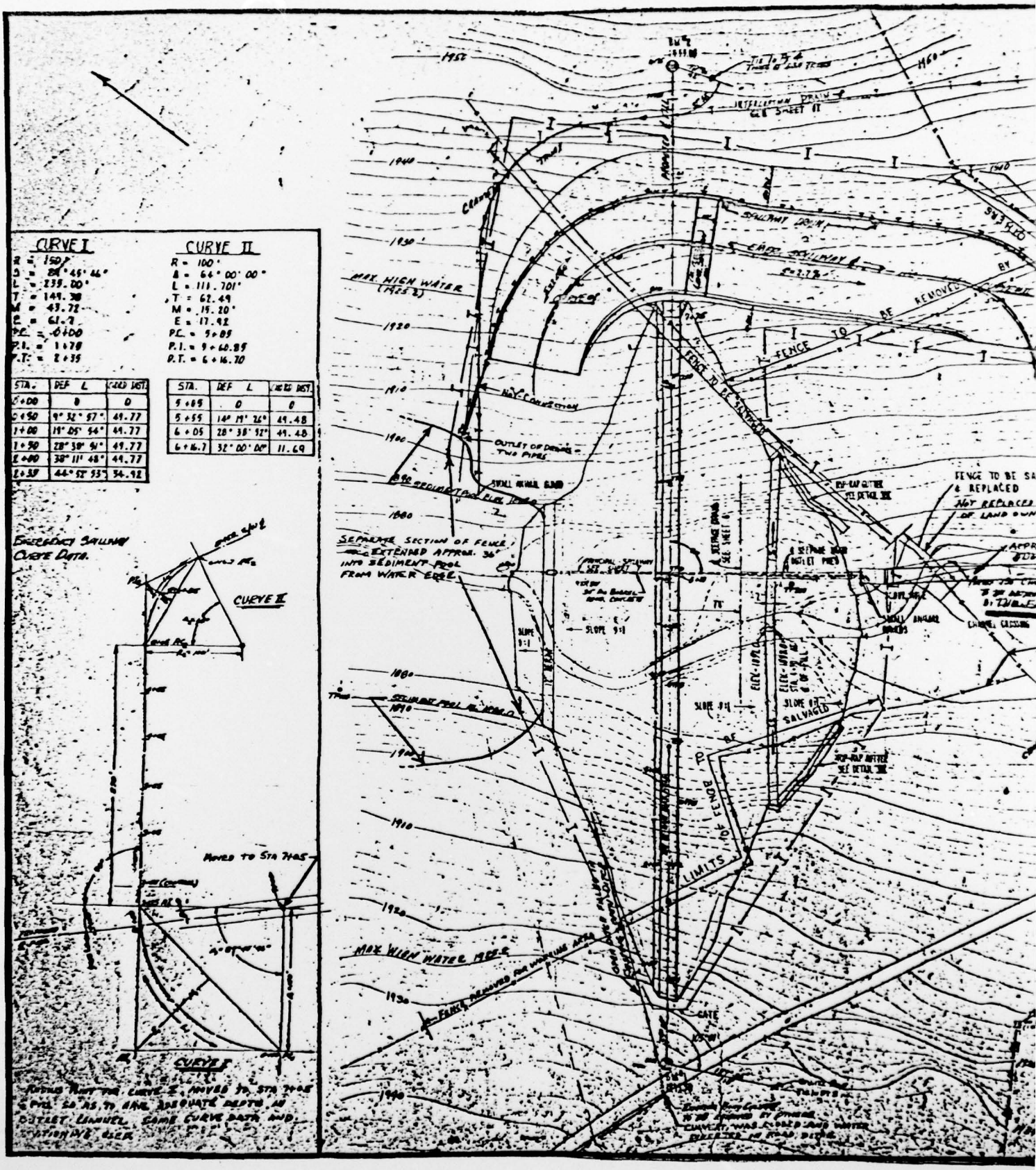

North Fork Dam
PENNSYLVANIA
QUADRANGLE LOCATION
VICINITY MAP
NORTH FORK DAM
Scale: 1" = 2000'

FIGURE 1


CURVE I
R = 150'
Δ = 89° 45' 46"
L = 239.00'
T = 149.38
M = 43.72
E = 61.7
P.C. = 0+00
P.I. = 1+78
P.T. = 2+39
CURVE II
R = 100'
Δ = 64° 00' 00"
L = 111.701'
T = 62.49
M = 19.20'
E = 17.92
P.C. = 5+05
P.I. = 5+60.89
P.T. = 6+16.70
STA. | DEF L | CHORD DIST.
0+00 | 0 | 0
0+50 | 9° 32' 57" | 49.77
1+00 | 19° 05' 54" | 49.77
1+50 | 28° 38' 51" | 49.77
2+00 | 38° 11' 48" | 49.77
2+39 | 44° 52' 53" | 34.92
STA. | DEF L | CHORD DIST.
5+05 | 0 | 0
5+55 | 14° 19' 26" | 49.48
6+05 | 28° 38' 52" | 49.48
6+16.7 | 32° 00' 00" | 11.69
EMERGENCY SPILLWAY CURVE DATA.
CURVE II
CURVE I
MOVED TO STA 7+05
MAX HIGH WATER
MAX WHEN WATER HERE
SEPARATE SECTION OF FENCE EXTENDED APPROX. 36' INTO SEDIMENT POOL FROM WATER EDGE
FENCE TO BE REMOVED
FENCE TO BE REMOVED & REPLACED
NOT REPLACED
OUTLET OF DRAIN - TWO PIPES
SEDIMENT POOL
SLOPE 3:1
SLOPE 4:1
SLOPE OF SALVAGED
LIMITS OF FEE BOND
GATE
1950
1940
1930
1920
1910
1900
1890
1880
1960

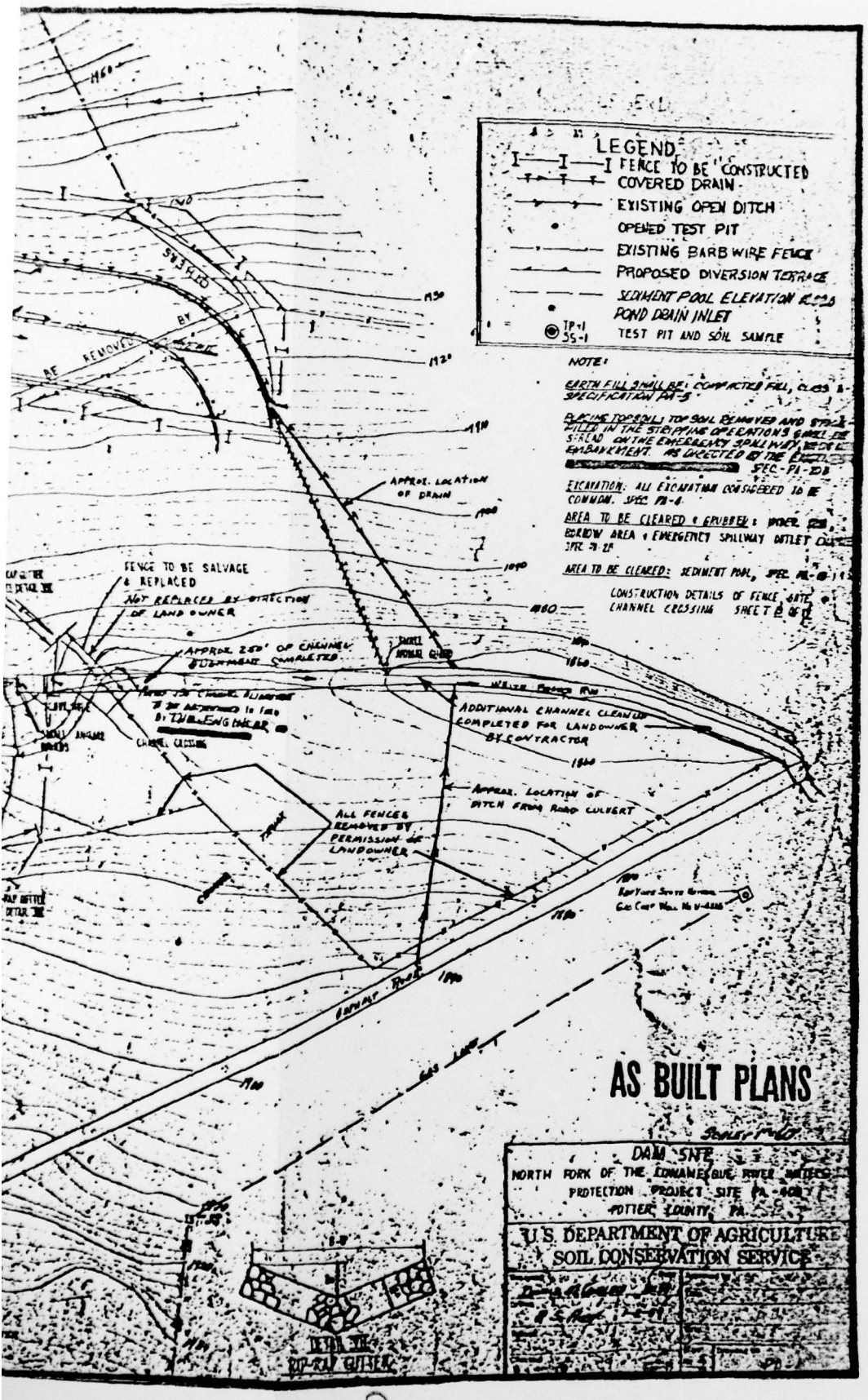
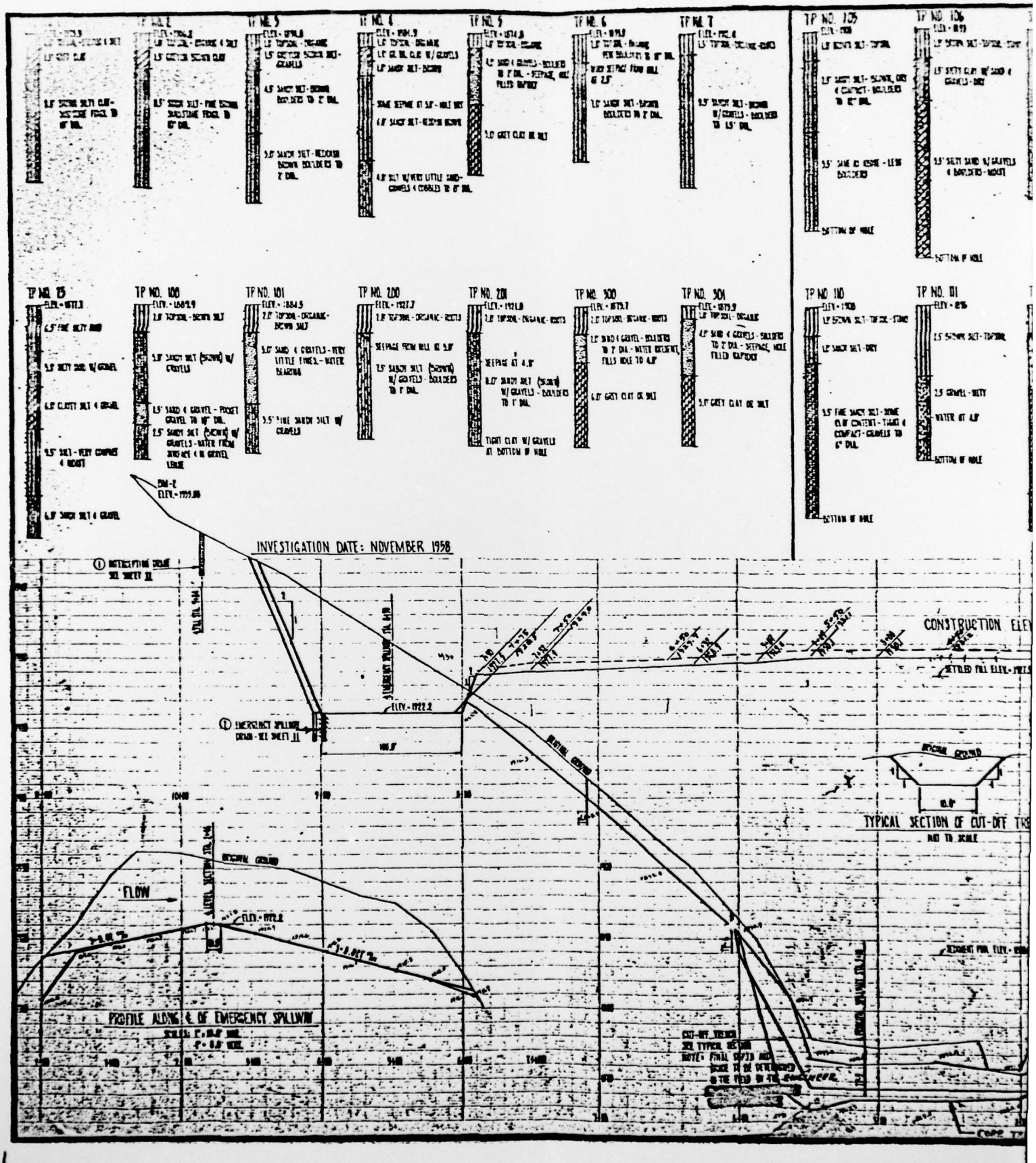


FIGURE 2

L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS & ARCHITECTS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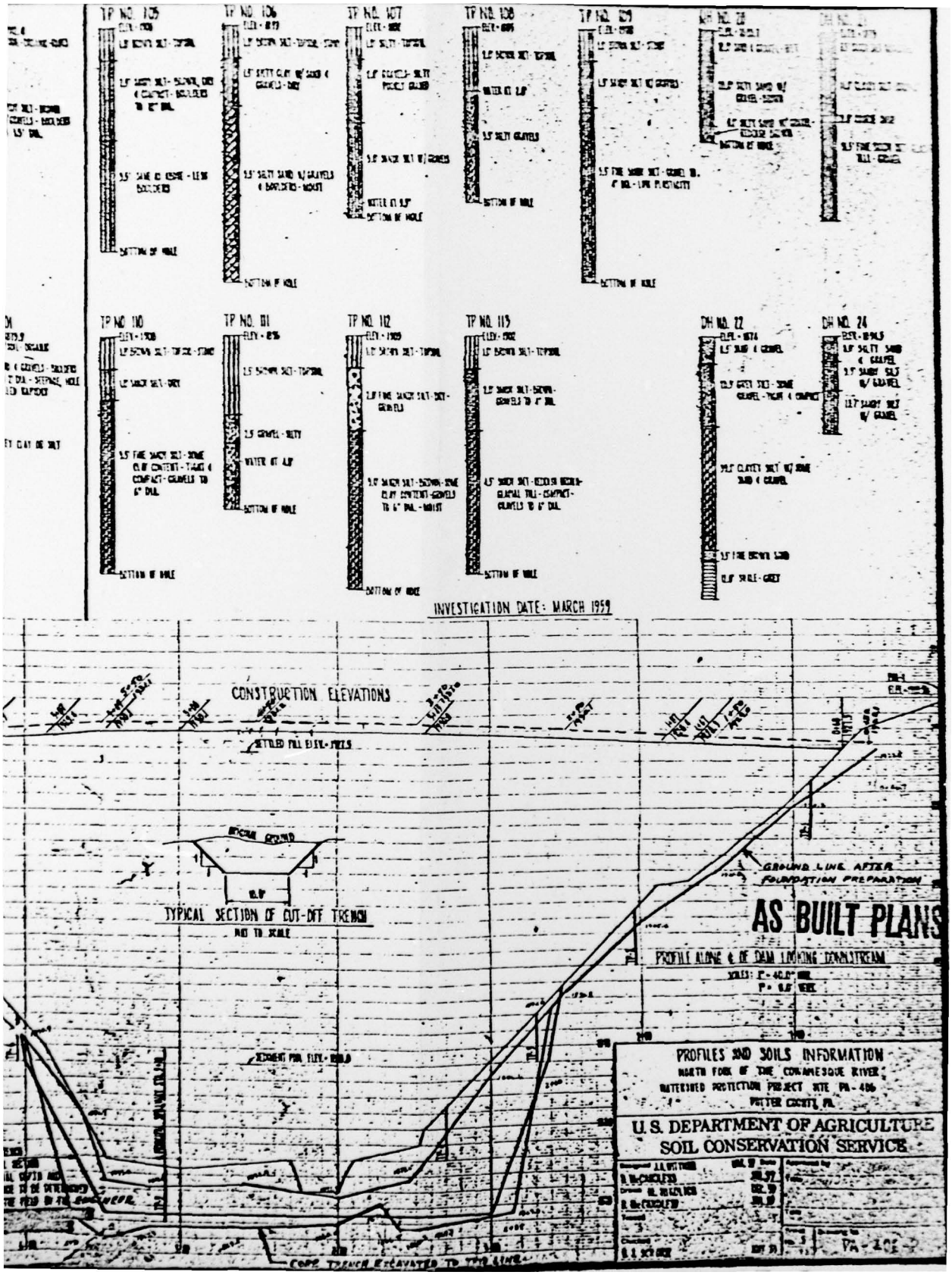
TP NO. 6
TP NO. 7
TP NO. 105
TP NO. 106
TP NO. 15
TP NO. 100
TP NO. 101
TP NO. 200
TP NO. 201
TP NO. 300
TP NO. 301
TP NO. 110
TP NO. 111
INVESTIGATION DATE: NOVEMBER 1958
CONSTRUCTION ELE
SETTLED FILL ELEV.
ELEV. 1922.2
EXISTING GROUND
INTACT GROUND
TYPICAL SECTION OF CUT-OFF TR
AND TO SCALE
FLOW
PROFILE ALONG ℄ OF EMERGENCY SPILLWAY
CUT-OFF TRENCH
SEE TYPICAL SECTION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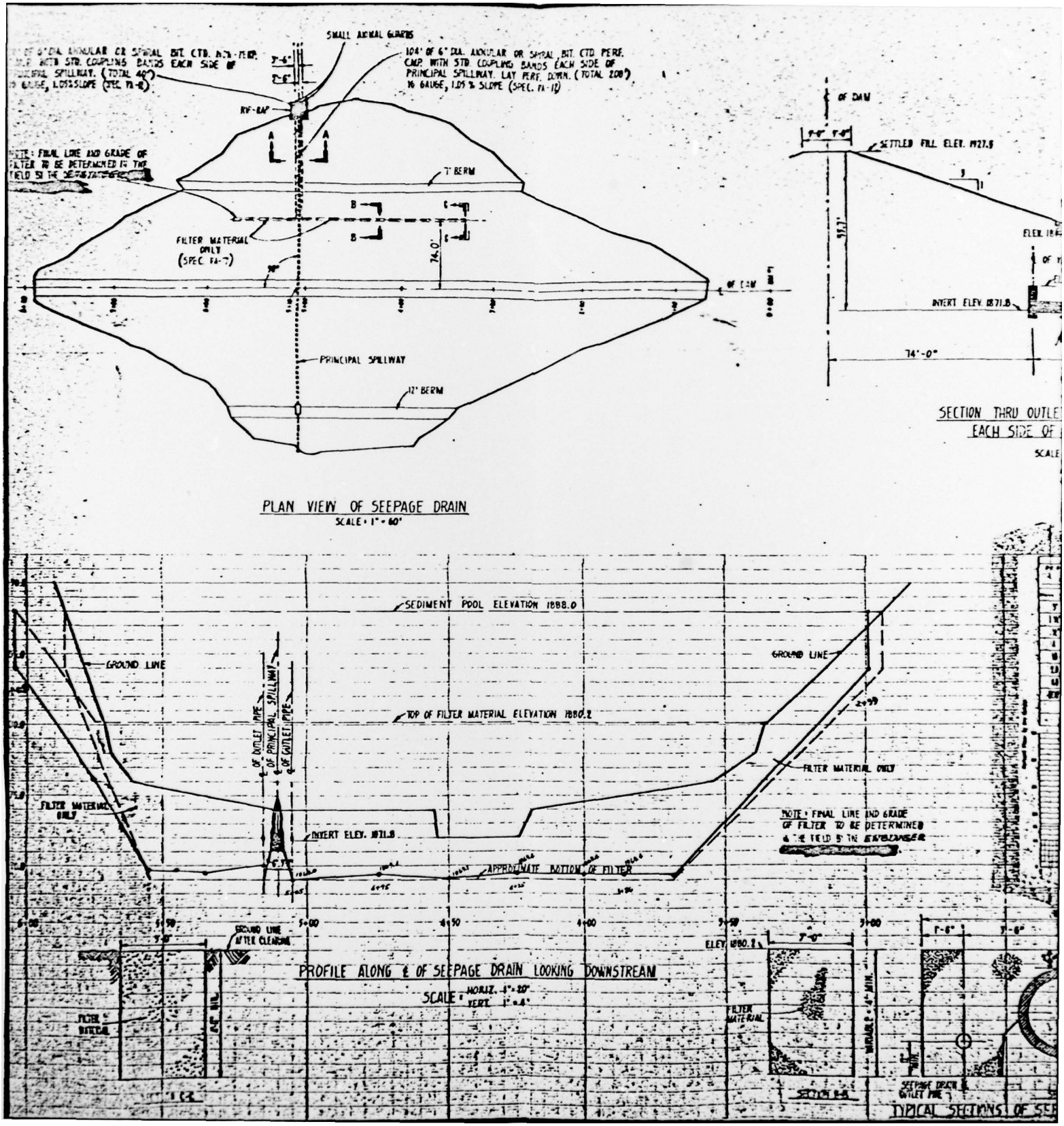
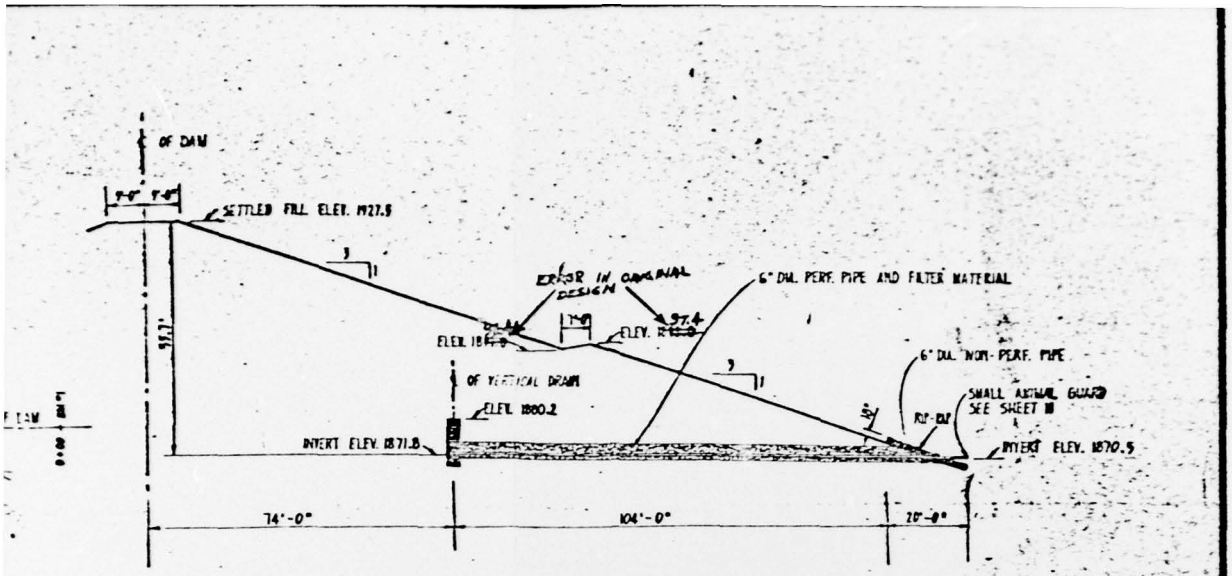
TP NO. 109
TP NO. 110
TP NO. 111
TP NO. 112
TP NO. 113
DH NO. 22
DH NO. 24
INVESTIGATION DATE: MARCH 1959
CONSTRUCTION ELEVATIONS
SETTLED FILL ELEV. - PEAKS
NATURAL GROUND
TYPICAL SECTION OF CUT-OFF TRENCH
NOT TO SCALE
GROUND LINE AFTER FOUNDATION PREPARATION
AS BUILT PLANS
PROFILE ALONG ℄ OF DAM LOOKING DOWNSTREAM
CORE TRENCH EXCAVATED TO THIS LINE
PROFILES AND SOILS INFORMATION
NORTH FORK OF THE CONANESQUE RIVER
WATERSHED PROTECTION PROJECT SITE PA-486
POTTER COUNTY, PA.
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

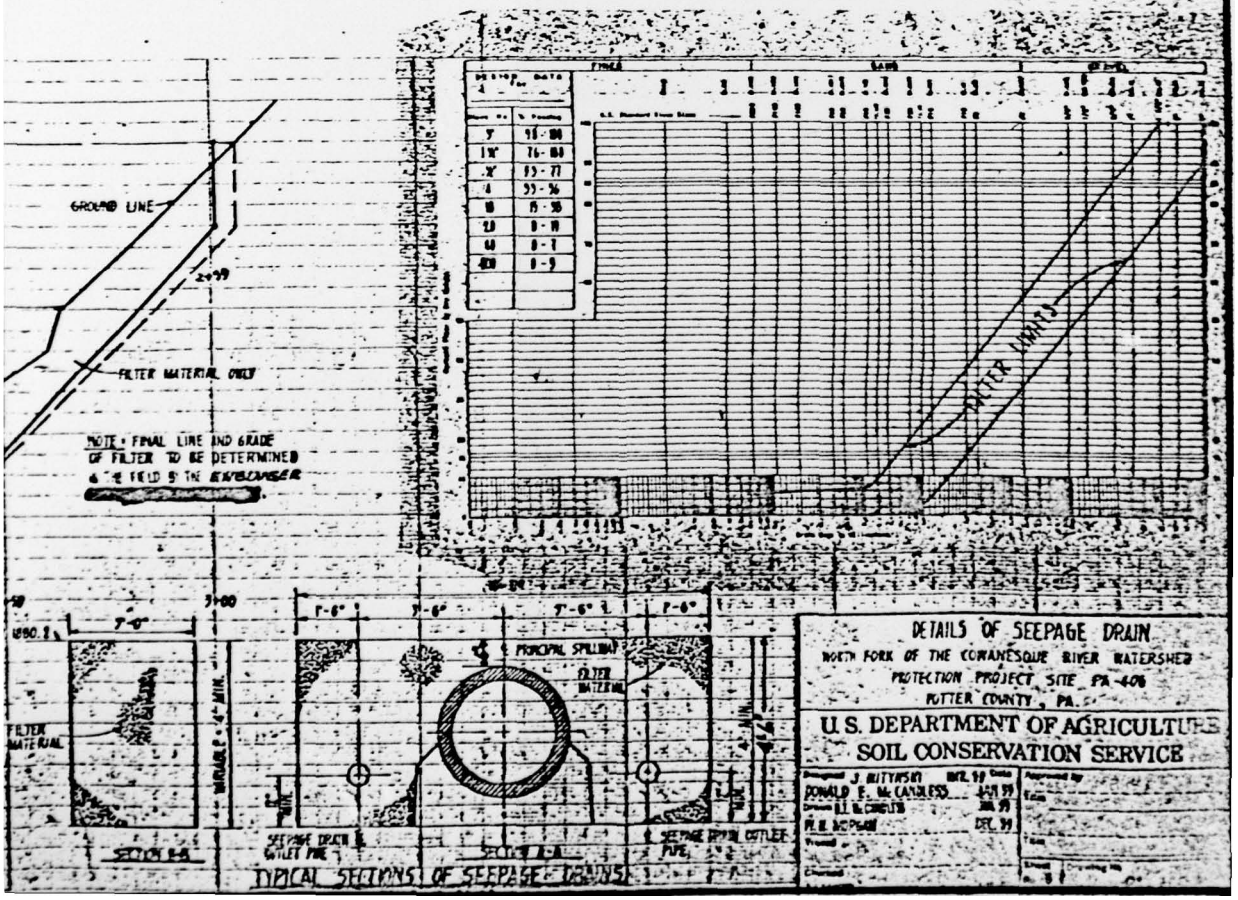

SMALL ANIMAL GUARDS
104' OF 6" DIA. ANNULAR OR SPIRAL BIT. CTD PERF. CMP. WITH STD COUPLING BANDS EACH SIDE OF PRINCIPAL SPILLWAY. LAY PERF. DOWN. (TOTAL 208')
16 GAUGE, 1.0% SLOPE (SPEC. FA-12)
RIP-RAP
7' BERM
FILTER MATERIAL ONLY (SPEC FA-7)
24.0'
PRINCIPAL SPILLWAY
12' BERM
OF DAM
SETTLED FILL ELEV. 1927.8
INVERT ELEV. 1871.8
74'-0"
PLAN VIEW OF SEEPAGE DRAIN
SCALE: 1" = 60'
SEDIMENT POOL ELEVATION 1888.0
GROUND LINE
TOP OF FILTER MATERIAL ELEVATION 1880.2
OF OUTLET PIPE
OF PRINCIPAL SPILLWAY
OF OUTLET PIPE
FILTER MATERIAL ONLY
INVERT ELEV. 1871.8
APPROXIMATE BOTTOM OF FILTER
NOTE: FINAL LINE AND GRADE OF FILTER TO BE DETERMINED BY THE FIELD ENGINEER
GROUND LINE AFTER CLEARING
ELEV. 1880.2
PROFILE ALONG ℄ OF SEEPAGE DRAIN LOOKING DOWNSTREAM
SCALE: HORIZ. 1" = 50'
VERT. 1" = 4'
FILTER MATERIAL
SECTION B-B
SEEPAGE DRAIN & OUTLET PIPE
TYPICAL SECTIONS OF SE



SECTION THRU OUTLET PIPE OF SEEPAGE DRAIN - EACH SIDE OF PRINCIPAL SPILLWAY

SCALE : 1" = 20'

AS BUILT PLANS

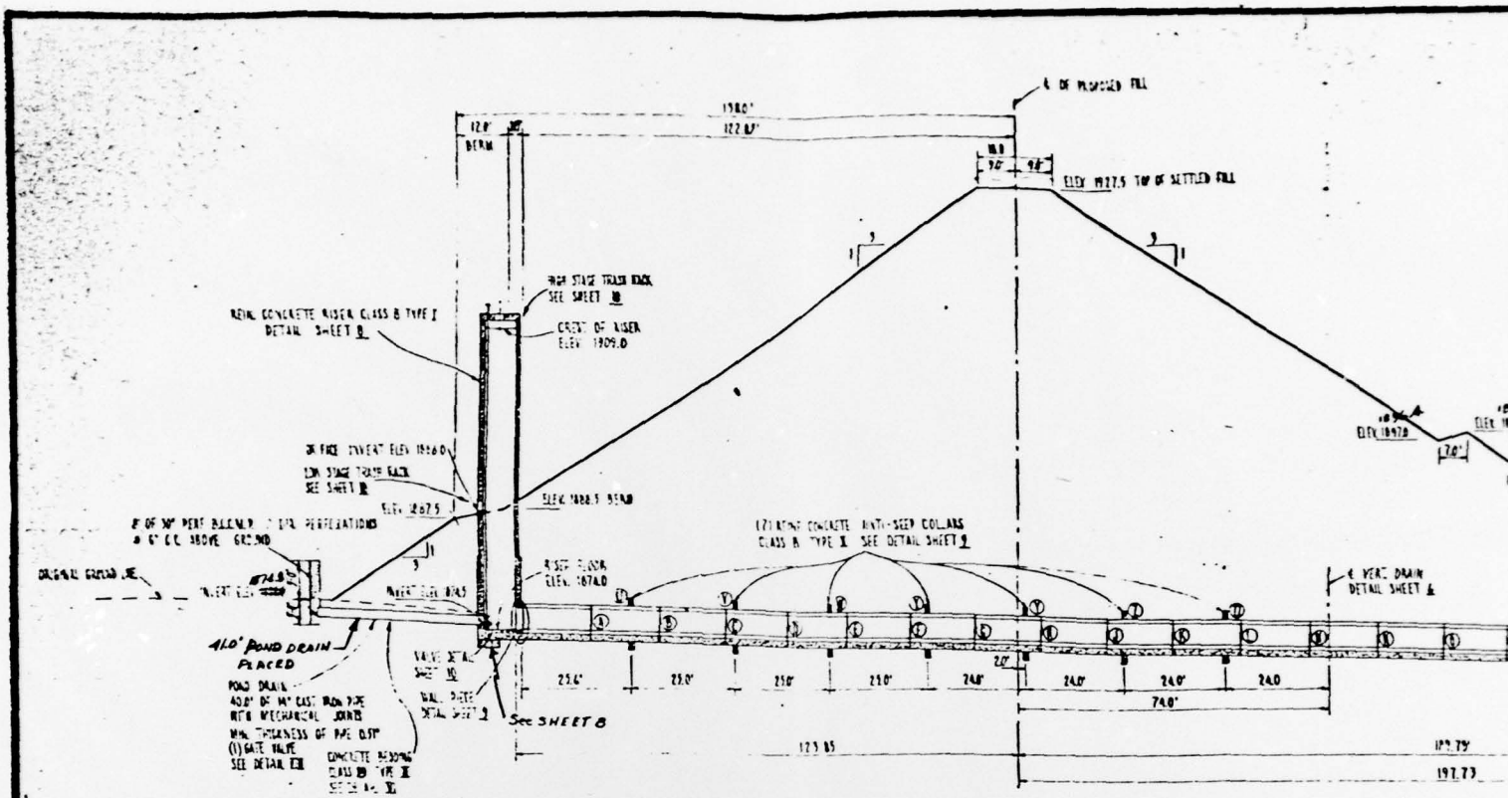


DETAILS OF SEEPAGE DRAIN

NORTH FORK OF THE COWANESQUE RIVER WATERSHED PROTECTION PROJECT SITE PA-406

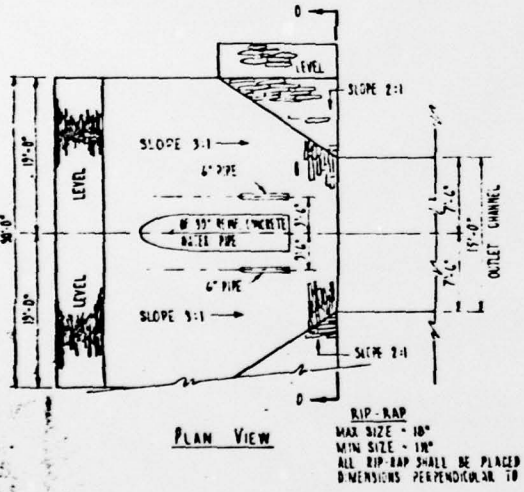
POTTER COUNTY, PA.

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE



PROFILE ALONG ℄ OF PRINCIPAL SPILLWAY

SCALE HOR. 1"=20' VERT. 1"=10'

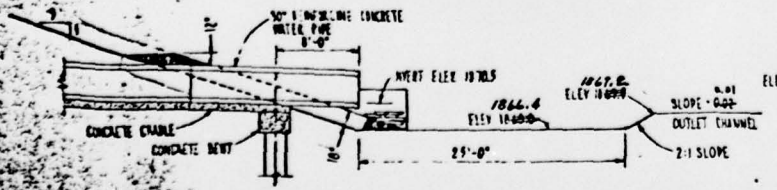


PLAN VIEW

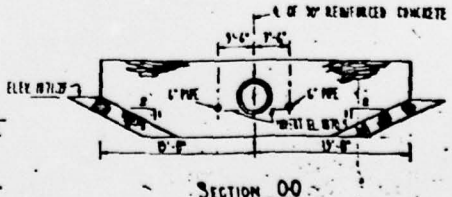
RIP-RAP
MAX SIZE = 18"
MIN SIZE = 12"
ALL RIP-RAP SHALL BE PLACED WITH THE LONG DIMENSIONS PERPENDICULAR TO THE LINE OF FLOW

TYPICAL SECTION OF OUTLET CHANNEL

POINT	
RISER	
A	
B	
C	
D	
E	
F	
G	
H	
J	
K	
L	
M	
N	
O	
P	
Q	
R	
S	
T	
U	
V	
W	
I	
Y	
Z	
ZZ	



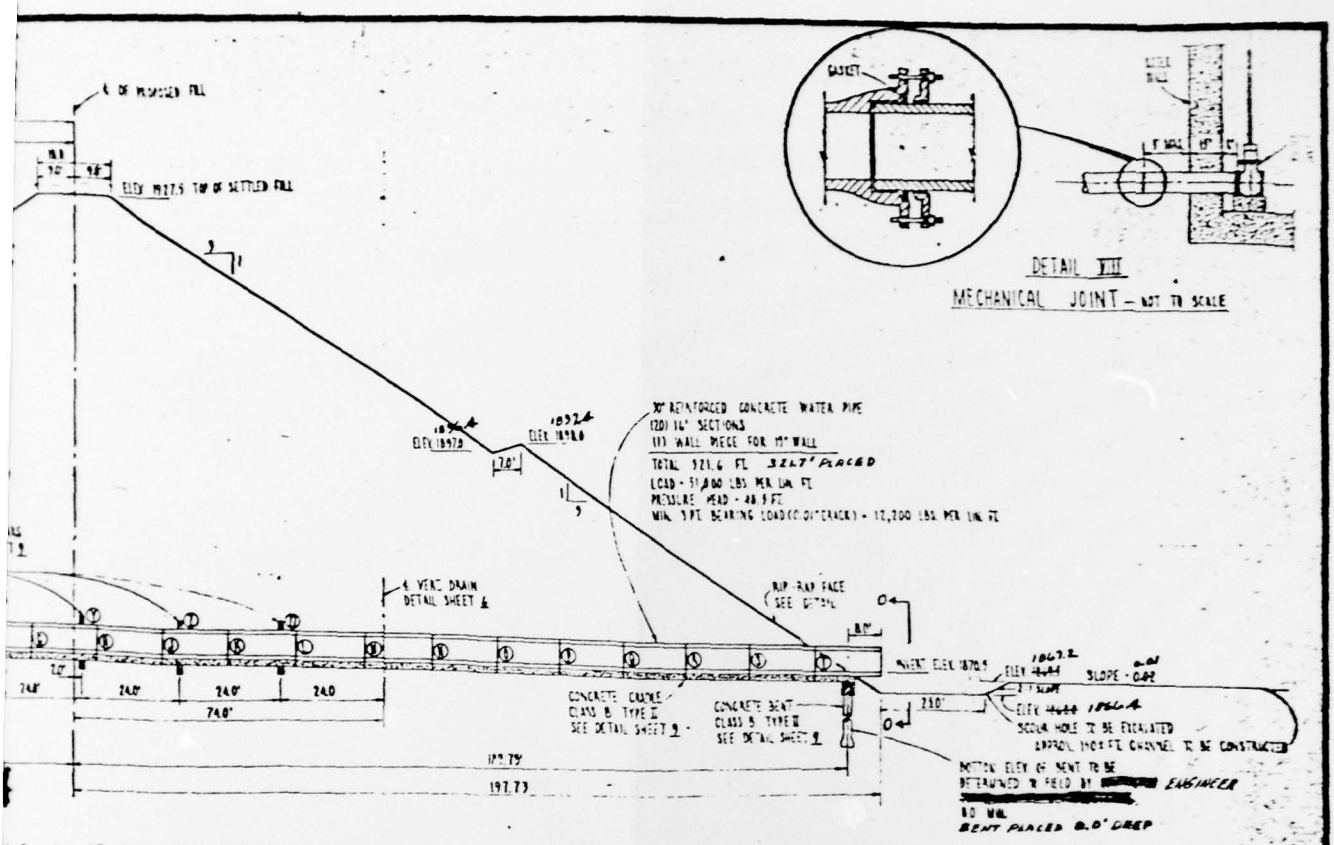
SECTION ON CENTERLINE



SECTION 00

DETAILS OF RIP-RAP BLANKET

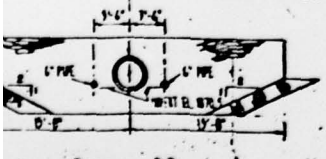
SCALE 10' = 1'-0"



DETAIL VIII
MECHANICAL JOINT – NOT TO SCALE

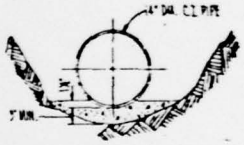
NG ℄ OF PRINCIPAL SPILLWAY

SECTION OF OUTLET CHANNEL



POINT	DISTANCE FROM DISCHARGE END OF 30" PIPE IN FEET	INVERT ELEVATION OF 30" PIPE WITH CAMBER	CONSTRUCTED INVERT ELEVATIONS
RISER	320.33	1874.00	1873.98
A	304.0	1873.98	1873.97
B	288.0	1873.96 97	1873.96
C	272.0	1873.95 95	1873.95
D	256.0	1873.90 90	1873.91
E	240.0	1873.89 89	1873.88
F	224.0	1873.76 75	1873.77
G	208.0	1873.67	1873.66
H	192.0	1873.60	1873.61
J	176.0	1873.56 40	1873.42
K	160.0	1873.46 20	1873.22
L	144.0	1872.97 95	1872.97
M	128.0	1872.77 70	1872.76
N	112.0	1872.56 45	1872.50
O	96.0	1872.46 20	1872.25
P	80.0	1871.79 95	1872.00
Q	64.0	1871.69 69	1871.71
R	48.0	1871.47 35	1871.36
S	32.0	1871.08 09	1871.06
T	16.0	1870.76	1870.76
U	294.79	1871.48 97	
V	269.79	1871.44 96	
W	244.79	1871.36 85	
X	219.79	1871.30 72	
Y	195.79	1875.61	
Z	171.79	1873.47 32	
ZZ	147.79	1872.09 71.80	

MIL CAMBER OF 10" AT B
ABOVE DIMENSIONS OF PIPE LENGTHS ARE BASED ON NOMINAL SIZE AND DO NOT INCLUDE CAMBER.



DETAIL VII
CONCRETE BEDDING

AS BUILT PLANS

8-18-60	INVERT ELEV OF 30" PIPE "E"	
DATE	LOCATION	APPROVED

REVISIONS

PROFILE ALONG ℄ OF PRINCIPAL SPILLWAY
NORTH FORK OF THE CONANESQUE RIVER WATERSHED
PROTECTION PROJECT SITE PA-486
POTTER COUNTY, PA.

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed J. DITTOLI - C. WEAVER	DATE 8-18-59	Approved by
Drawn R.T. BROWNING	DATE 8-18-59	Title
Traced		Date
Checked		Sheet No. 7-4

FIGURE 5

L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS & ARCHITECTS

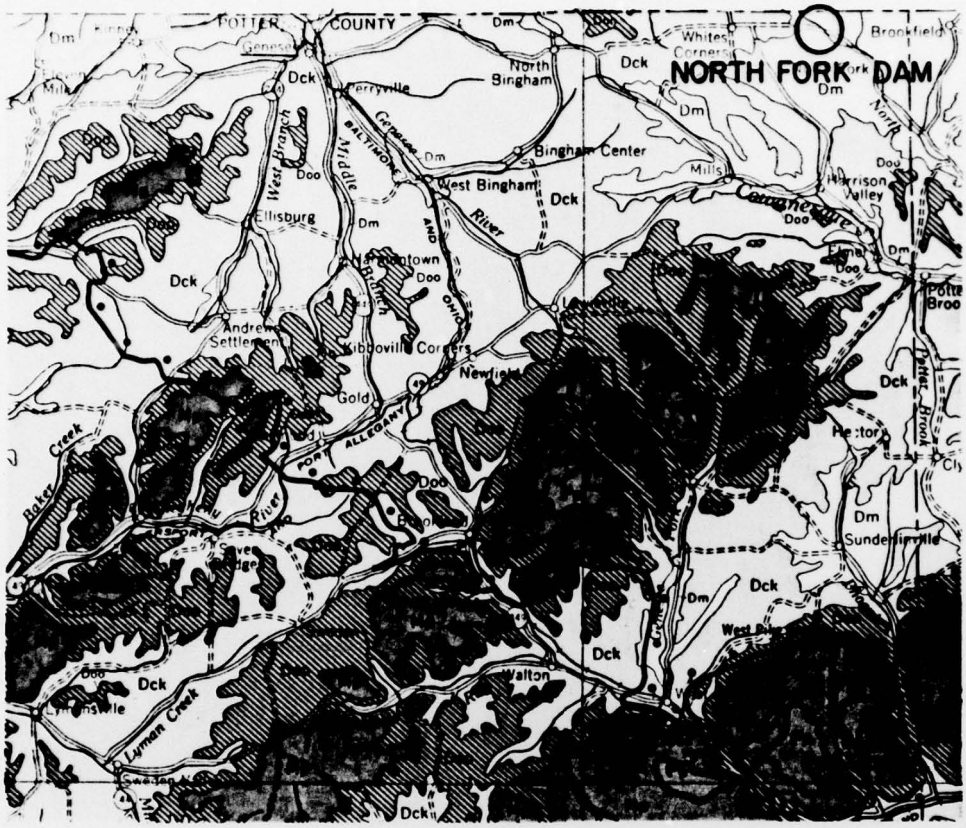
APPENDIX F

GENERAL GEOLOGY

General Geology.

North Fork Dam lies within the Allegheny Mountain Section of the Appalachia Plateau Physiographic Province as described by Fennemann (1938). The area is structurally typified by broad gentle folding. Glaciation has rounded the ridges and filled major valleys with thick deposits of sand and gravel.

North Fork Dam is underlain by Upper Devonian aged marine sediments. These sediments are gray to olive brown shales, graywackes, and sandstones. They extend for a thickness of 2000 to 3000 feet. These marine sediments are made up of the Chemung and Portage beds which include the Burket, Brallier, Herrell, and Trimmers Rock. The Tully Limestone lies at the base of the marine beds.



GEOLOGIC MAP OF NORTH FORK DAM AREA

Dm — **Marine beds**

Gray to olive brown shales, graywackes, and sandstones; contains "Chemung" beds and "Portage" beds including Burket, Brallier, Harrell, and Trimmers Rock; Tully Limestone at base.

Scale: 1:250,000